

equalizer to reduce channel-specific impairments from said received pre-defined training sequence prior to selecting said initial matrix parameters.

14. Method for reducing cross-talk in a communications system
- 5 comprising a plurality of communications channels, each communications channel propagating a respective set of in-phase (I) and quadrature (Q) signals, said method comprising:
- (a) processing at least one set of I and Q signals according to a respective pre-coding matrix to produce respective pre-coded I and Q signals;
- 10 (b) communicating said at least one set of pre-coded I and Q signals via a respective communication channel;
- (c) receiving, for each communicated set of pre-coded I and Q signals, data indicative of differences between transmitted and received signals;
- 15 (d) adapting respective pre-coding matrices in response to respective received difference data; and
- (e) repeating steps (a) through (d) until said difference data associated with said at least one set of I and Q signals is less than a threshold difference level.
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15. The method of claim 14, wherein said data indicative of differences between transmitted and received signals comprises mean square error data.
- 25 16. The method of claim 14, wherein said of in-phase (I) and quadrature (Q) signals form carrierless amplitude and phase (CAP) modulated signals.
17. The method of claim 14, wherein said of in-phase (I) and quadrature (Q) signals form quadrature amplitude modulated (QAM) signals.
- 30 18. The method of claim 14, further comprising:

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(f) increasing an amplitude level of said at least one set of said I and Q signals; and

(g) repeating steps (a) through (d) until said difference data associated with said at least one set of I and Q signals is less than a second
5 threshold difference level.

19. Apparatus, comprising:

a transmitter, for adapting an encoded data signal according to at least one pre-coded signal, said at least one pre-coded signal being determined
10 with respect to encoded signals from at least one other transmitter, said pre-coder function adapting said encoded signal in response to a pre-coded matrix to produce a pre-coded encoded signal.

20. The apparatus of claim 19, wherein said transmitter further comprises
15 a filtering function, for adapting said pre-coded encoded signal to a transmission channel, said transmission channel tending to impair signals transmitted therethrough.

21. The apparatus of claim 20, further comprising:

20 a plurality of receivers, for receiving respective transmitted signals from respective transmission channels, each of said receivers determining an impairment level associated with a corresponding transmission channel and propagating impairment indicative data to a corresponding transmitter;

said transmitters adapting respective pre-coder matrices in response
25 to respective channel impairment indicative signals.

22. Apparatus for reducing cross-talk in a communications system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels, said apparatus comprising:

30 a transmitter including a summer for adding a first encoded data signal to at least one pre-coded data signal to produce an output signal, said at least

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one pre-coded data signal determined according to a respective pre-coding matrix, each of said at least one pre-coding matrices having associated with it a respective encoded data signal;

5 said transmitter communicating said first pre-coded signal to a
respective first communication channel; and

 said transmitter modifying said at least one pre-coding matrices in response to an impairment indicative signal in a manner tending to offset channel impairments experienced by said output signal within said first communications channel.

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23. Apparatus for reducing cross-talk in a communications system comprising a plurality of transmitters for transmitting encoded data signals via respective communications channels, said apparatus comprising:

15 means for processing a first encoded data signal according to at least
one pre-coding matrix to produce a first pre-coded signal, each of said at least one pre-coding matrices having associated with it a respective encoded data signal;

 means for communicating said first pre-coded signal to a respective first communication channel; and

20 means for adapting said at least one pre-coding matrices in response
to an impairment indicative signal;

 said processing tending to offset channel impairments within said first communications channel.

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